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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/777,391	FRANCE, ROBERT M.	
	Examiner	Art Unit	
	ANDREW LAI	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhl et at (US 2003/0118026, K1 hereinafter) in view of Kilkki et al (US 6,041,039, K2 hereinafter).

K1 discloses "system and method for mapping quality of service levels between MPLS and ATM connections in a network element" (p1 left col. lines 1-3) performing "mapping of ATM quality of service to a [internal] class of service" ([0063]) and then "mapping of [internal] class of service and drop precedence to [MPLS] EXP value" ([0069]) wherein "the class of service assigned to a connection is determined by the value of its ATM QoS parameters" ([0064] lines 5-6). K1's invention comprises:

- **With respect to Independent claims 1, 15, 26, 29 and 34**

  Regarding claim 1, *a method* (the "method" cited above) *comprising:*

  receiving, with a network device (fig. 2 "ATM/MPLS edge switch 122", note that the same switch is denoted as "ATM/IP edge switch 122" in fig. 6. For convenience of later discussion, they are both denoted hereinafter as "A/M 122"), *a packet* (fig. 6 ATM "cell 620") *containing a first* CLP (cell loss priority) *information* (refer to fig. 6 and see "cell 620, with header 824 [should be 624] and CLP bit 822 [should be 622], is received

by ATM card 200", [0065] lines 6-7) *wherein the first* CLP *information specifies a class of service* (refer to fig. 3 and see "CLP bit 305 indicates the drop precedence value of that particular cell 300 i.e. whether cell 300 is eligible to be 'dropped'", [0043] lines 7-9, noting that CLP itself, as taught, offers differentiated *class of service* or *CoS* to a certain degree because it puts ATM cells into different priority classes when cell drop is necessary. However, CLP may not be considered as full featured CoS in conventional meaning. This will be discussed further later) *for the packet in a format conforms to a first network protocol used within a network* ("CLP bit" cited above is uniquely specific or *conforming to* ATM *network protocol*);

storing, within the network device ("A/M 122"), *intermediate CoS information* (fig. 7 "class of service 702", which is provided as "mapping 614" of fig. 6, which "may be that provided in table 700 of fig. 7", [0071] lines 8-9, and since "Prior to establishing connections through A/M 122, mapping 614 of the class of service and the drop precedence to a value for EXP field 632 is provided to control complex 214", [0072] lines 4-6, it must be *stored* priori) *that provides a universal classification mechanism independent of: (i) any layer two protocols used within the network, and (ii) protocols of layers on top of layer two protocols used within the network* (noting that "class of service 702" is shown having 1-8 different classes *independent* of ATM, *layer two*, or MPLS, *layer on top of layer two*, which K1's ATM cells eventually destine to);

accessing the first class of service information ("CLP bit 305/622" of figs. 3/6) *within the packet* (ATM "cell 620") *to determine the class of service for the packet* (refer to fig. 3 and see "A value of zero (0) for CLP bit 305 indicates that cell 300 is not eligible

to be discarded. A value of one (1) indicates that cell 300 is eligible to be discarded", [0043] lines 10-13. It should be noted that "CLP bit 305" must be *accessed* in K1 in order for the following to happen, refer to fig. 3, "data and header information for ATM 300 must be transposed into an internal cell 350", [004] lines 1-2, wherein "header 356 contains CLP bit 355 mapped from CLP bit 305 of header 304", [0044] lines 11-12).

mapping the first CoS information ("CLP") *to a second CoS information* (MPLS "EXP value", [0069] line 2, which is shown in fig. 7 columns 704 and 706 for "CLP = 0" and "CLP = 1" respectively) *using the intermediate CoS information* (fig. 7 "class of service 702", which is shown therein to be *used* for *mapping* "CLP = 0/1" to "EXP values" in columns 704 and 706, noting that class of "CLP = 0" cells are mapped to even numbered EXP values while class of "CLP = 1" to odd numbered EXP values), *wherein the second CoS information* (MPLS "EXP values") *specifies the class of service for the packet in a format that conforms to a second network protocol* ("MPLS protocol") *used within the network* ("MPLS card 204 of A/M 122 maps the class of service for the connection and the drop precedence value of each internal cell 650 to a value for EXP field 632", [0070] lines 2-4, noting that "EXP field" in a MPLS frame is well-known in the art to be used to *specify the CoS information* of a MPLS frame which *conforms to* the MPLS *network protocol*); *and*

outputting the packet with the network device to forward the packet within the network in accordance with the second network protocol ("MPLS card 204 inserts the appropriate value into EXP field 632 of each outgoing MPLS frame 630 and transmits them over the E-LSP, LDP 686, of MPLS network 104", [0070] lines 6-8), *the packet*

("MPLS frame 630") *containing the second CoS information that specifies the class of service information for the packet* (again "MPLS card 204 inserts the appropriate value into EXP field 632 of each outgoing MPLS frame 630 and transmits them over the E-LSP, LDP 686, of MPLS network 104", [0070] lines 6-8, which, "for example, an internal cell 650 with CLP bit 652 equal to '0' belonging to a connection with class of service 7 (row 722, column 704) will have the value 6, '110' in binary, inserted into EXP field 632 of MPLS frame 630", [0071] lines 5-9) *in accordance the second network protocol* ("MPLS frame" must be *in accordance* with the MPLS *network protocol*).

Regarding claim 15, *a system* (fig. 6 showing "A/M 122") *comprising:*

a first interface (fig. 6 "ATM card 200") *to receive a packet* (ATM "cell 620") *containing data including a first* CLP (cell loss priority) *information* (refer to fig. 6 and see "cell 620, with header 824 [should be 624] and CLP bit 822 [should be 622], is received by ATM card 200", [0065] lines 6-7, wherein, refer to fig. 3, "CLP bit 305 indicates the drop precedence value of that particular cell 300 i.e. whether cell 300 is eligible to be 'dropped'", [0043] lines 7-9) *that conforms to a first network protocol used within a network* ("CLP bit" cited above is uniquely specific or *conforms to* ATM *network protocol used within an* ATM *network*), *access the data of the packet* ("CLP bit 305/622" of figs. 3/6) *to determine the first* CLP *information* (refer to fig. 3 and see "A value of zero (0) for CLP bit 305 indicates that cell 300 is not eligible to be discarded. A value of one (1) indicates that cell 300 is eligible to be discarded", [0043] lines 10-13. It should be noted that "CLP bit 305" must be *accessed* in K1 in order for the following to happen, refer to fig. 3, "data and header information for ATM 300 must be transposed into an

internal cell 350", [004] lines 1-2, wherein "header 356 contains CLP bit 355 mapped from CLP bit 305 of header 304", [0044] lines 11-12), *and maps the first* CLP *information* ("CLP bit 305/622" in ATM cell 300/620 of figs. 3/6) *to intermediate* CLP *information* ("CLP bit 355/652" in "internal cell 350/650" of figs. 3/6) *by updating the data of the packet* ("a network element may change CLP bit 305 of a cell 300", p3 right column lines 5-6, and further "ATM cell 300 is converted into internal cell 350 by the addition of internal header 352", [0044] lines 8-9), *wherein the intermediate* CLP *information provides a universal classification mechanism independent of any layer two protocols and protocols of layers on top of layer two protocols used by the network device* (noting that the internal "CLP 305/622" is a bit that "a network element may change" *independent* of ATM CoS, *layer two*, or MPLS, *layer on top of layer two*, which K1's ATM cells eventually destine to); *and*

a second interface (fig. 6 "MPLS card 204") *to map the intermediate* CLP *information to a second CoS information* (MPLS "EXP value", [0069] line 2, which is shown in fig. 7 columns 704 and 706 for "CLP = 0" and "CLP = 1" respectively, noting that "EXP field" in a MPLS frame is well-known in the art to be used for showing *the CoS information* of MPLS, and noting further thereof that class of "CLP = 0" cells are mapped to even numbered EXP values while class of "CLP = 1" to odd numbered EXP values) *that conforms to a second network protocol* (fig. 6 outputted "MPLS frame 630" which will have to *conform* to MPLS *network* 104 *protocol*) *by updating the data of the packet* (above cited "CLP = 0/1" *updated* to "MPLS frame 630" having header 634 comprising "EXP field" 632).

Regarding claim 26, *a network device* (fig. 6 “A/M 122”) *comprising:*

a control unit (“control complex 214") *that:*

stores intermediate CoS information (fig. 7 “class of service 702", which is provided as "mapping 614" of fig. 6, which “may be that provided in table 700 of fig. 7”, [0071] lines 8-9, and since “Prior to establishing connections through A/M 122, mapping 614 of the class of service and the drop precedence to a value for EXP field 632 is provided to control complex 214”, [0072] lines 4-6, it must be *stored* priori) *that provides a universal classification mechanism independent of any layer two protocols and protocols of layers on top of layer two protocols used within the network* (noting that "class of service 702" is shown having 1-8 different classes *independent* of ATM, *layer two*, or MPLS, *layer on top of layer two*, which K1’s ATM cells eventually destine to);

associate the internal CoS information (“class of service 702” cited above) *with a packet based on data within the packet that defines first* CLP [cell loss priority] *information* (shown in fig. 7 "class of service 702" being *associated with a* cell *based on* "CLP = 0/1" in column 704/706) *wherein the first* CLP *information conforms with a first network protocol* (well known in the art that "CLP bit" is uniquely specific to or *conforms with* ATM *network protocol*); *and*

maps the associated intermediate CoS information ("class of service 702" of fig. 7) *to a second CoS information* (fig. 6 MPLS “EXP field 632”, [0070] line 2, which is shown in fig. 7 having different values in columns 704/706 for "CLP = 0/1" for different "class of service" values in column 702), *wherein the second CoS information conforms*

to a second network protocol ("EXP field" is well known in the art to be a field in MPLS frames which *conforms to* the MPLS *network protocol*).

Regarding claim 29, *a computer-readable medium storing a computer program* ("a system and method of translating a set of transmission parameters related to a first transmission protocol from said first transmission protocol to a second transmission protocol for a data element being sent", Abstract lines 1-4) *that comprises instruction to cause a processor* ("A/M 122", fig. 2) *to* (the following operations disclosed by Huhl will have to be *caused* by *a computer-readable medium storing a computer program* with *instruction*):

receive a packet (fig. 6 showing receiving ATM "cell 620", which is equivalent to "ATM cell 300" in fig. 3) *having a first* CLP *information* ("CLP bit 305/622" of "ATM cell 300/620" of figs. 3/6) *wherein the first* CLP *information conforms to a first network protocol used within a network* (as well known, "CLP bit" is uniquely specific or *conforms to* ATM *protocol used within an* ATM *network*);

store intermediate CoS information (fig. 7 "class of service 702", which is provided as "mapping 614" of fig. 6, which "may be that provided in table 700 of fig. 7", [0071] lines 8-9, and since "Prior to establishing connections through A/M 122, mapping 614 of the class of service and the drop precedence to a value for EXP field 632 is provided to control complex 214", [0072] lines 4-6, it must be *stored* priori) *that provides a universal classification mechanism independent of any layer two protocols and protocols of layers on top of layer two protocols used by a network device* (noting that

"class of service 702" is shown having 1-8 different classes *independent* of ATM, *layer two*, or MPLS, *layer on top of layer two*, which K1's ATM cells eventually destine to);

access the data of the packet ("ATM cell 350/620" of figs. 3/6) *to determine the first* CLP *information* (refer to fig. 3 and see "A value of zero (0) for CLP bit 305 indicates that cell 300 is not eligible to be discarded. A value of one (1) indicates that cell 300 is eligible to be discarded", [0043] lines 10-13. It should be noted that "CLP bit 305" must be *accessed* in K1 in order for the following to happen, refer to fig. 3, "data and header information for ATM 300 must be transposed into an internal cell 350", [004] lines 1-2, wherein "header 356 contains CLP bit 355 mapped from CLP bit 305 of header 304", [0044] lines 11-12);

process the data of the packet including the first CLP *information* ("CLP bit" cited above) *to include the intermediate CoS* ("class of service 702" cited above) *for mapping the first* CLP *information to a second CoS information* (MPLS "EXP value", [0069] line 2, which is shown in fig. 7 columns 704 and 706 for "CLP = 0" and "CLP = 1" respectively, which "CLP" values with an *inclusion* of different values "class of service 702" are mapped to different "EXP values" in columns 704 and 706, noting especially that class of "CLP = 0" cells are mapped to even numbered EXP values while class of "CLP = 1" to odd numbered EXP values) *that conforms to a second network protocol* ("EXP field" in MPLS frame must *conform to* MPLS *network protocol*) *by updating the data of the packet* ("MPLS card 204 forms a MPLS frame 630 from one or more internal cells 650, as described above, and insets the appropriate value for EXP field 632 into outer lavel 634", [0077] lines 4-7).

Regarding claim 34, *a method* (the "method for mapping quality of service levels between MPLS and ATM", Title) *comprising:*

processing a packet (fig. 6 incoming ATM "cell 620", which is equivalent to "ATM cell 300" in fig. 3) *with a first interface* (fig. 6 "ATM card 200") *to access data within the packet* (refer to fig. 3 and see "A value of zero (0) for CLP bit 305 indicates that cell 300 is not eligible to be discarded. A value of one (1) indicates that cell 300 is eligible to be discarded", [0043] lines 10-13. It should be noted that "CLP bit 305" must be *accessed* in K1 in order for the following to happen, refer to fig. 3, "data and header information for ATM 300 must be transposed into an internal cell 350", [004] lines 1-2, wherein "header 356 contains CLP bit 355 mapped from CLP bit 305 of header 304", [0044] lines 11-12);

associating the packet with metadata based on the data within the packet (fig. 7 columns 704/706 having "CLP = 0/1" being *associated with metadata* "class of service 702"), *wherein the metadata defines protocol-independent class of service (CoS) information* (see fig. 7 again "class of service 702" is shown to be *independent of* ATM or MPLS protocol), *and wherein the protocol-independent CoS information* ("class of service 702") *provides a universal classification mechanism* (fig. 7 shows "class of service 702" *universally classified* into 1-8 different classes) *and is independent of any layer two protocol* ("ATM protocol" cited above) *and protocols of layer on top of layer two* ("MPLS" protocol cited above, noting that said "class of service 702" is internally classified into 8 levels *independent of* ATM protocol and/or MPLS protocol) *used by the network device* (again "A/M 122", as shown in fig. 6, converting "ATM cell 620" to "MPLS frame 630"); *and*

subsequently processing the packet with a second interface (fig. 6 “MPLS card 204”) *of the network device* (“A/M 122”, and “MPLS card 204 forms a MPLS frame 630 from one or more internal cells 650”, [0077] lines 4-5, noting that said "internal cell 650" is a converted ingress "ATM cell 620” that carries original “CLP 622” which in turn is converted to an internal “CLP 652") *in accordance with the protocol-independent CoS information* (fig. 7 shows “CLP = 0/1” being mapped to different “EXP values” in columns 704/706 *in accordance with the protocol-independent CoS information* “class of service 702” having eight different values, noting especially that “CLP = 0” cells are mapped to even numbered "EXP values" and "CLP = 1" cells mapped to odd numbered “EXP values”).

Having discussed K1 in view of all of the Independent claims above, it is herein acknowledged that K1’s teaching of “CLP bit” does not appear to exactly serve as a full featured *class of services* because it does not appear to convey the conventional meaning of CoS, typically, data rate and/or data nature such as real-time or non-real-time. Also, K1’s mapping of ATM CLP to MPLS EXP bit is associated with ATM "service category" (fig. 5), said “service category” is full featured CoS having various well-known ATM bit rates in real-time (rt) and/or non-real-time (nrt) nature, such as CBR, rtVBR, nrtVBR, ABR, UBR so on and so forth. However, K1 is silent on embedding said ATM "service category" in the header of an ATM cell while embedding CLP therein.

However, having a data packet or cell to explicitly *contain* full featured *class of service information* is an old and conventionally well-known technique. For example, the Applicant admits (Specification of present application, page 2, first paragraph),

"Example of CoS information used by conventional protocols includes IP Type of Service (ToS), MPLS experimental (EXP) bits, VLAN user priority, and IPv6 traffic class. Typically, CoS information is encoded within the header information associated with each packet". Yet another example can be seen in K2 wherein full featured CoS information is embedded in the header of ATM cells, and even more specifically, such CoS information can be stored in an ATM cell header's CLP bits and/or some other bits if needed. Below is a discussion of K2.

K2 discloses "A system and method for managing information transfers over a network through priority level feedback" (Abstract lines 1-2) which is "based on nominal bit rate (NBR) service category" (col. 3 line 30). K2 comprises:

Regarding all Independent claims, *receiving packet containing a class of service (CoS) information* ("If the user requires a real-time connection, each cell transmitted from the user's UNI will have the service class bit in the cell header set to indicate that the payload of the cell contains real-time information", col. 7 lines 20-23, and on the other hand, "If the user does not require a real-time service connection, … the rt/nrt service class bit of each cell header is set to indicate that the payload of the cell includes non-real-time information", col. 7 lines 33-37. K2 also discloses, very specifically, "the CLP bit in the cell header may instead be used to discern between real-time and non-real-time payload", col. 7 lines 40-42, and if CLP bit is not enough, "other header bits may be redefined to represent cell priority level and service class designations", col. 8 lines 30-31, by borrowing, for example, "the current Generic Flow Control (GFC) field", col. 8 lines 20-21).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify K1 by adding K2's explicit teaching of embedding full featured class of service values in ATM cell header instead of obtaining connection-based class of service in order to provide a more robust, efficient and flexible service of class manipulation method by making a "minor modification to the existing ATM cell header" (K2, col. 8 line 35) that "is significantly offset by the substantial advantages offered" (K2, col. 8 line 36), including "a significant reduction in network and traffic management overhead and complexity" (K2, col. 8 lines 38-39).

(It is **important to note** that with the addition of K2 to K1, K1 will be able to perform a full featured "class of service" mapping on per-cell instead of per-connection basis. K1 in view of K2 can inspect the ATM "service class" bits, added by K2, in an ingress "ATM cell 300/620" header, use "mapping 600" policy or table 500 in fig. 5 to map the ATM "service class/category 502" (fig. 5) to internal "class of service 508" (fig. 5), then use "mapping 614" policy or table 700 in fig. 7 to map corresponding internal "class of service 702" (fig. 7), which is the same as "class of service 508" of fig. 5, in conjunction with "CLP = 0/1" values, to various different MPLS "EXP values" ranging from 1 to 8 as shown in columns 704/704 of fig. 7. This sets the context and background for the discussion below regarding various independent claims).

- **With respect to Dependent claims**

  K1 with the addition of K2 discloses:

  Regarding claim 2, *wherein mapping comprises:*

  applying a first policy (K1, fig. 5) *to map the first CoS information* (K2, ATM "service class bits" embedded in ATM cell header) *to the intermediate CoS information* (K1, "fig. 5 is a table of an exemplary mapping of ATM Quality of Service parameters to a class of service in the AT/MPLS edge switch of fig. 1", [0023], which "QoS parameters" comprise "ATM service category", [0047] last two lines); *and*

  applying a second policy (K1, fig. 7) *to map the intermediate CoS information* (K1, "class of service 702" of fig. 7) *to the second CoS information* ("fig. 7 is a table of

an exemplary mapping of class of service and drop precedence of a cell to a value for the EXP field in a MPLS frame in the A/M of fig. 1", [0025]).

Regarding claims 3 and 17, *wherein the first policy* (K1, fig. 5) *comprises a protocol-specific policy in accordance with the first network protocol* (K1, fig. 5 depicting *an* ATM *protocol-specific policy* because the mapping thereof is "ATM Quality of Service parameters to a class of service in the A/M of fig. 1", [0023]), *and*

wherein the second policy (K1, fig. 7) *comprises a protocol-specific policy in accordance with the second network protocol* (K1, fig. 7 depicting *an* MPLS *protocol-specific policy* because the mapping thereof is "class of service and drop precedence of a cell to a value for the EXP field in a MPLS frame in the A/M of fig. 1", [0025]).

Regarding claim 5, *wherein receiving a packet* (K1, fig. 6 "ATM cell 620") *comprises receiving the packet with a first interface* (K1, fig. 6 "ATM card 200") *of a network device* (K1, fig. 6 "A/M 122"); *and*

wherein forwarding the packet (K1, fig. 6 "MPLS frame 630") *comprises forwarding the packet with a second interface* (K1, fig. 6 "MPLS card 204") *of the network device* (K1, fig. 6 "A/M 122").

Regarding claims 6/19, *wherein the first interface is associated with a first interface card* (K1, fig. 6 "ATM card 200") *of a network router* (K1, fig. 6 "A/M 122"), *and the second interface is associated with a second interface card* (K1, fig. 6 "MPLS card 204") *of the network router.*

Regarding claim 7, *updating, with the first interface, data included within the packet* (K1, fig. 5 "service category 502" which would be K2's ATM "service class bits"

embedded in an ATM cell) *to include the intermediate CoS information* (K1, fig. 5 showing "service category 502" *updated to include* internal "class of service 508"); *and*

communicating the packet and the intermediate CoS information from the first interface to the second interface (K1, fig. 7 depicting "class of service 702", which is the same as "class of service 508" of fig. 5, being *communicated to* the "MPLS card 204" wherein "a mapping of class of service levels and drop precedence values to values for EXP field" is performed, [0070] last three lines).

Regarding claim 8, *wherein updating the data included within the packet comprises adding a header to the data of the packet that specifies the intermediate CoS information* (K1, fig. 6 "internal cell 650" with *added* "internal header 656, connection identifier field 658, header 654 and CLP bit 652", [0065] lines 10-11, which "CLP bit 652" would become ATM "service class bits" with the addition of K2 and now integrated into "class of service 508" in accordance with fig. 5 table 500).

Regarding claim 9, *wherein forwarding the packet comprises: removing the intermediate CoS information from the data of the packet with the second interface; updating the data of the packet to include the second CoS information; and forwarding the packet with the second CoS information with the second interface* (K1, "in the second stage of providing the appropriate value for EXP field 632 for transmission across E-LSPs, MPLS card 240 of A/M 122 maps the class of service for the connection and the drop precedence value of each internal cell 650 to a value for EXP field 632", [0070] lines 1-5, and particularly "internal header 656, connection identifier field 658, header 654 and CP bit 652m us received by MPLS card 204, its contents are

transposed and MPLS frame 630, with outer label 634 and EXP filed 632, and it is transmitted from MPLS card 240", [0065] last 5 lines, for example, "an internal cell 650 with class of service 7 (row 722, column 704) will have the value 6, '110' in binary, inserted into EXP field 632 of the MPLS frame 630", [0071] lines 5-9).

Regarding claims 10 and 22, *wherein the intermediate CoS information* (K1, "class of service 508/702" of figs. 5/7) *comprises protocol-independent metadata associated with the packet* (said internal "class of service 508/702" is shown to *comprise protocol-independent metadata* of 1-8 levels).

Regarding claims 11, 23 and 33, *wherein the first CoS information and the second CoS information each comprise one of Internet Protocol (IP) Type of Service (ToS) information, Multiprotocol Label Switching (MPLS) experimental (EXP) bits, virtual Local Area Netowork (VLAN) user priority information, and Internet Protocol version 6 (IPv6) traffic class information* ("MPLS card 204 inserts the appropriate value into EXP field 632 of each outgoing MPLS frame 630", [0070] lines 6-7, noting that K1's A/M is bidirectional, i.e., "direction 240" and "direction 246" in fig. 2, which means that said "EXP field" can be of either *the first CoS information* in "direction 246" or *the second CoS information* in "direction 240").

Regarding claim 12, *wherein receiving a packet comprises receiving the packet with a router* (K1, fig. 6 "A/M 122") *and wherein forwarding the packet comprises forwarding the packet with the router* (K1, fig. 6 the same "A/M 122").

Regarding claim 13, *wherein forwarding the packet comprises forwarding the packet with a centralized forwarding engine of the router* (K1, fig. 6 "control complex

214" which "maps the ATM QoS parameters to the class of service using mapping 600. The information can then be sent to MPLS card 204", [0068] lines 7-9, and then "card 204" *forwards*, under the control of complex 214, MPLS frames as shown in fig. 6).

Regarding claim 14, *wherein forwarding the packet comprises forwarding the packet with a forwarding component within an interface card of the router* (K1, fig. 6 depicting forwarding MPLS frame by "MPLS card 204" which will have to have a sending or *forwarding component* therein).

Regarding claim 16, *wherein the first interface* (K1, fig. 6 "ATM card 200") *applies a first policy* (K1, fig. 6 "mapping 600") *to map the first CoS information* (K1, fig. 5 ATM "service category 502" which would be, with the addition of K2, "ATM service class bits" embedded in an ATM cell header) *to the intermediate CoS information* (K1, figs. 5/7 "class of service 508/702"); *and*

wherein the second interface (K1, fig. 6 "MPLS card 204") *applies a second policy* (K1, fig. 6 "mapping 614" of fig. 7 which shows the details) *to map the intermediate CoS information* (K1, fig. 7 "class of service 702") *to the second CoS information* (K1, fig. 7 "EXP field" 704/706 per "CLP = 0/1").

Regarding claim 20, *wherein the first interface updates the data of the packet* (K1, fig. 6 "CLP bit 622", which would be, with the addition of K2, "ATM service class/category bits" embedded in ATM cell header) *by adding the intermediate CoS information to the data of the packet* (K1, fig. 5 showing "service category 502" *updated to include* internal "class of service 508"), *and communicates the updated packet having the intermediate CoS information to the second interface* (K1, "control complex 214

maps the ATM QoS parameters to the class of service using mapping 600. The information can then be sent to MPLS card 240", [0068] lines 7-9).

Regarding claim 21, *the second interface* (K1, fig. 6 "MPLS card 204") *removes the intermediate CoS information from the packet, and updates the data of the packet by adding the second CoS information to the packet* (K1, "in the second stage of providing the appropriate value for EXP field 632 for transmission across E-LSPs, MPLS card 240 of A/M 122 maps the class of service for the connection and the drop precedence value of each internal cell 650 to a value for EXP field 632", [0070] lines 1-5, and particularly "internal header 656, connection identifier field 658, header 654 and CP bit 652m us received by MPLS card 204, its contents are transposed and MPLS frame 630, with outer label 634 and EXP filed 632, and it is transmitted from MPLS card 240", [0065] last 5 lines, for example, "an internal cell 650 with class of service 7 (row 722, column 704) will have the value 6, '110' in binary, inserted into EXP field 632 of the MPLS frame 630", [0071] lines 5-9).

Regarding claim 25, *wherein the first interface is associated with a first interface card* (K1, fig. 6 "ATM card 200"), *and the second interface is associated with a second interface card* (K1, fig. 6 "MPLS card 204").

Regarding claim 27, *wherein the network device* (K1, fig. 6 "A/M 122") applies policies (K2, fig. 6 "mapping 600" of fig. 5 having the details thereof) *to map the first CoS information* (K1, fig. 6 "CLP bit 622", which would become, with the addition of K2, "ATM service class/category bits" embedded in ATM cell header) *to the intermediate CoS information* (fig. 5 showing ATM "service category 502" mapped to "class of service

508") *and to map the intermediate CoS information to the second CoS information* (K1, fig. 7 showing “class of service 702", which is the same as “class of service 508” in fig. 5, mapped to “EXP field” 704/706 per “CLP = 0/1”).

Regarding claim 28, *wherein the network device comprises a router* (K1, “A/M 122” cited for claim 26 above).

Regarding claim 30, *wherein the computer program further comprises instructions to cause the processor* (K1, “control complex 214” of fig. 6) *to apply a policy* (K1, “mapping 600” of fig. 6 which “is that provided in table 500 of fig. 5”, [0066] lines 6-7) *to the packet* (K1, fig. 6 “ATM cell 620”) *to generate the intermediate CoS information from the first CoS information* (K1, see fig. 5 showing how internal "class of service 508" at different levels is *generated from the first CoS information*, i.e., corresponding ATM "service category 502", which with the addition of K2 would be “ATM service class bits” embedded in ATM cell header).

Regarding claim 31, *wherein the policy* (K1, fig. 6 “mapping 600” or fig. 5 showing details thereof) *comprises a protocol-specific policy in accordance with the first network protocol* (K1, the policy "provided in table 500 of fig. 5" is *in accordance with the first network protocol*, i.e., ATM *network protocol*).

Regarding claim 32, *wherein the intermediate CoS information* (K1, figs. 5/7 “class of service 508/702”) *comprises protocol-independent metadata associated with the packet* (note that “class of service 508/702” *comprises* ATM/MPLS *protocol-independent metadata* of levels 1-8 *associated with the* internal cell 650 of fig. 6, which is mapped from ingress ATM "message 606”).

Regarding claim 35, *wherein processing the packet comprises applying a first policy* (K1, “mapping 600” of fig. 6 which “is that provided in table 500 of fig. 5”, [0066] lines 6-7) *to the packet* (K1, “ATM cell 620” of fig. 6) *to map the packet to the protocol-independent CoS information* (fig. 5 shows how ATM “service category 502”, which would become, with the addition of K2 “AT service class bits” embedded in ATM cell header, is *mapped to the protocol-independent CoS information*, i.e., "class of service 508"), *wherein the first policy is specific to a first network protocol* (K1, the policy "provided in table 500 of fig. 5" is *specific to a first network protocol*, i.e., ATM *network protocol*), *and*

wherein subsequently processing the packet comprises mapping the protocol-independent CoS information (K1, fig. 7, “class of service 702” which is the same as internal “class of service 508” of fig. 8) *to a second policy* (K1, fig. 7, and it shows how said “class of service 702” is mapped to MPLS “EXP field” 704/706 depending on CLP = 0/1) *that is specific to a second network protocol* (K1, "EXP field” is *specific to* MPLS, *a second network protocol*), *and applying the second policy to the packet* (K1, fig. 6 egress “MPLS frame 630” having "EXP field 632” *applied* thereto).

Regarding claim 36, *wherein applying the first policy* (K1, fig. 6 “mapping 600” or fig. 5 showing details thereof) *comprises applying the first policy to first header information of the packet* (K1, fig. 6 showing “mapping 600” being *applied to* “header 624” of ATM “cell 620”, which becomes "header 652" of the "internal cell 650" afterwards), *wherein the first header information conforms to the first network protocol* (K1, “header 624” must *conform to the first network protocol*, i.e., ATM), *and*

wherein applying the second policy (K1, fig. 6 "mapping 614" or fig. 7 showing details thereof) *comprises applying the second policy to second header information of the packet* (K1, fig. 6 “header 654” of “internal cell 650”, which becomes “header 634” having "EXP field 632” of egress “MPLS frame" after applying *the second policy* of fig. 7, which is “mapping 614” of fig. 6), *wherein the second header information conforms to the second network protocol* (K1, “EXP field” must *conform to the second network protocol*, i.e., MPLS).

Regarding claim 37, *storing the protocol-independent CoS information* (K1, figs. 5/7 “class of service 508/702” as part of “mapping 600/614” policy of fig. 6) *as metadata* (figs. 5/7 showing 8 different levels, as *metadata*, for "class of service 508/702") *within a memory of the network device* ("A/M 122", and see "Prior to establishing connections through A/M 122, a mapping 600 of ATM QoS parameters to [internal] class of service values is provided to control complex 214 of A/M 122", [0066] lines 1-4, which “mapping 600” obviously must be *stored* since it was provided “prior to establishing connection”. The same is stated regarding “mapping 614”, [0072]); *and*

associating the metadata with the packet throughout an entire packet-processing path of the network device (see figs. 5 and 7, both denoting *the metadata* comprise “class of service” wherein fig. 5 is *associated with the packet* as ingress ATM cell while fig. 7 *associated with the packet* as egress MPLS frame, that is that the *metadata* is *associated with the packet throughout an entire packet-processing path of the network device* starting from the ingress ATM cell and ending with the egress MPLS frame).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 4 and 8 rejected under 35 U.S.C. 103(a) as being unpatentable over K1 in view of K2.

K1 discloses claimed limitations as applied to claims 2 and 16 in section 2 above. K1 further discloses:

Regarding claims 4 and 18, *presenting a user interface to receive input; and configuring the second policy* (fig. 7 table 700) *based on the input* (the mapping of table 700 is configurable by the user", [0071] lines 9-10, which requires *a user interface* as can be appreciated by one skilled in the art. Noting that although K1 does not explicitly states that fig. 5 table 500, denoting *the first policy*, can be user-configurable, it would have been obvious to one skilled in the art at the time of the invention to modify K1 by doing the same as that for table 700, denoting *the second polity*, in order to provide more flexibility in user control over the CoS mapping in the edge switch considering the fact that a complete user control enables the user to adjust to any special circumstances wherein special class of services conversion is desired, as often the case well known in the art).

5. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over K1 in view of K2, as applied to claim 15 above, and further in view of Hughes et al (US 6,434,612, Hughes hereinafter).

K1 in view of K2 discloses claimed limitations as described in section 2 above icluding:

Regarding claim 24, *wherein the first interface with the first protocol* (K1, fig. 6 "ATM card 200" with ATM protocol), *and second interface with the second protocol* (K1, fig. 6 "MPLS card 204" with MPLS protocol).

K1 in view of K2 does not expressly disclose that said firs/second interfaces each *comprises a logical interface.*

Hughes discloses "a connection control interface for switches in a network" (Abstract line 1) using a "multiple VSI controller (fig. 7) comprising:

Regarding claim 24, an interface *comprises a logical interface* (some "controllers may control all interfaces because each controller is presented a view of a switch having a particular set of logical interfaces. The logical interfaces are either physical interfaces or virtual interfaces, and the set of logical interfaces presented to different controllers will differ", col. 7 lines 15-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the system of K1 by adding the logical interface configuration of Hughes to K1 in order to provide a better connection mechanism to overcome prior art problem wherein "prior art connection protocols do not support distributed processing thereby requiring connection control messages to be sent to a single point

on the associated switch," which "creates a bottleneck in communications" and "complicate the task of managing and controlling a network switch and limit the flexibility and performance scalability of the network" (Hughes, col. 3 lines 16-22).

Response to Arguments

6. Applicant's arguments with respect to all independent claims over previously applied art, especially US 6,243,394 of Deng and US 2002/0044558 of Gobbi et al have been considered but are moot in view of the new ground(s) of rejection.

Applicant present arguments essentially over many of the newly added features in those substantially amended independent claims against previously applied arts of Deng and/or Gobbi.

However, the newly applied art of K1 in view of K2 offers the teachings of the newly added features Applicant argued over. They are basically:

(Remarks page 11 first paragraph) Deng fails to teach processing packet and associating the packet with metadata based on the data within the packet, for which Applicant is referred to K1's figs. 5 and 7, in view of K2, especially K1's "class of service" as the *metadata* in association with *data within the packet* which in the case of fig. 5 is ATM "service category", which with the addition of K2 would be embedded in ingress ATM cells, and in the case of fig. 7 "EXP field" of columns 704 and 706 which is embedded in egress MPLS frame header.

(Remarks page 11 second paragraph) Deng fails to teach or suggest … the protocol-independent CoS information provides a universal classification mechanism and is independent of any layer two protocols and protocols of layers on top of layer

two, for which Applicant is referred, again, to K1's figs. 5 and 7 wherein shown clearly is that the *protocol-independent CoS information* of "class of service" has 8 levels defined therein and are *independent of* ATM “service category”, *layer two protocol*, and “MPLS EXP field*”, layer on top of layer two*.

(Remarks page 13 second paragraph) None of the protocols convert the actual contents of the packet to a different format, for which Applicant is referred to K1’s teaching in fig. 6 showing ingress ATM cell header 624 being changed to internal cell header 654 and eventually to egress MPLS frame header 634, each comprising corresponding class of service information conform to their respective protocol. It should also be understood that mapping CoS by changing headers is performed through out the whole process of K1 because K1 performs, as first stage in the ingress side, “mapping of ATM Quality of Service to a Class of Service”, [0063], wherein “ATM Quality of Service” parameters includes "service categories", and, as second stage in the egress side, "mapping of Class of Service and Drop Precedence to EXP Value", [0069]; and Applicant is referred to read the paragraphs associated with those two stages for all the details reading on many of the Applicant's original as well as newly added features to the amended independent claims, which have been fully discussed throughout this Office Action.

Finally, Examiner would like to point out, respectfully, that many of arguments Applicant presented with regarding to previously applied arts are not persuasive either. However, since new ground of rejection is made as necessitated by Applicant's substantial amendments to all independent claims, Examiner finds no need at this time

to respond to those non-persuasive arguments against previously applied arts, which no longer enter this Office Action. However, Examiner reserves the right of responding in the feature, should such needs arise.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,463,068 discloses router with class of service mapping wherein ingress packets have embedded in the header CoS tags which are mapped to a different set of CoS values for different ports serving different connections.

US 2002/0032800 provides transporting QoS mapping information in a packet radio network using also nominal bit rate (NBR) technique wherein IP Type of Service (ToS) octet in a packet header is mapped to CoS parameters used in mobile communications network and vice versa.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW LAI whose telephone number is (571)272-9741. The examiner can normally be reached on M-F 7:30-5:00 EST, Off alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on 571-272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew Lai/
Examiner, Art Unit 2616

/Kwang B. Yao/

Supervisory Patent Examiner, Art Unit 2616